JHRS, Vol. 3 (2), 2024

DOI: 10.34002/jhrs.v3i2.61

Sustainability Risk Management Practices and Operational Performance of the Liner Shipping in General Santos City, Philippines

Mary Christ D. Canapit[1,2]

[1]College of Business Administration and Accountancy,
Mindanao State University – General Santos, Philippines
[2]Ateneo de Davao University, E. Jacinto Street, 8016 Davao City, Philippines
marychrist.canapit@msugensan.edu.ph

Abstract

The researcher conducted descriptive-correlational research to explore the relationship between sustainability risk management practices and shipping lines' operational performance within General Santos City, Philippines. The study assessed the comprehensive landscape of sustainability risk management (SRM) through a multi-dimensional lens, focusing on its application in addressing environmental issues, social impacts, and ethical concerns. The extent of operational performance was predicated upon evaluating indicators, including cost, quality, flexibility, and delivery, as perceived by employees. The empirical findings unveiled that the conscientious implementation of sustainability risk management practices focusing on environmental issues positively affected operational performance. It is recommended that for organizations to bolster the execution of supply risk management protocols as a means to address environmental issues effectively. This research could serve as a foundational platform for future scholarly investigations in the field of sustainability risk management within the maritime industry.

Keywords: *management, sustainability risk management, operational performance, liner shipping, Region XII, Philippines*

Introduction

People's lifestyles globally have changed due to the overall economic growth and positive economic changes. These changes increased demand for manufactured goods and products, increasing transportation (Sjöqvist & Sorocka, 2011). The greater the market demand, the greater the need to supply through import and export, which resulted in greater sea transportation demand (Anderson et al., 2015). The advancement of international trends for the past ten years has dramatically changed shipping fleets to meet seaborne trade demands and requirements (Sjöqvist & Sorocka, 2011).

Sustainability was rising within the shipping line industry as early as the 1970s; sustainability was employed to describe an economy in equilibrium with fundamental ecosystems (Stivers, 1976). According to United Nations Department of Economic and Social Affairs (2011), three areas emerged in sustainable development: the sustainability pillars, which include the environment, economics, and society. Sustainability risk management was first mentioned by Anderson (2005) in which he identified SRM or sustainability risk management as something that "deals with risks emanating from the environmental and corporate social responsibility areas". SRM is about managing threats and serves as a tool for corporate sustainability (Anderson et al., 2015). However, SRM focuses on environmental, social, and governance-related risks. In this study, sustainability risk management means the initiatives and strategies implemented to mitigate the impact of environmental, social, and governance-related risks.

The shipping industry was no exception for SRM. It has undertaken initiatives mitigating its environmental and social impacts ("Asia switches," 2018). The International Maritime Organization has proposed decarbonizing cargo ships by 2050, requiring at least a 50% reduction in greenhouse gases (GHG) and carbon emissions ("Asia switches," 2018). In the Philippines, there were also sustainability efforts in the shipping industry, which are focused on filling skill gaps, upgrading technologies, eradicating graft, and mitigating environmental impacts within the shipping industry (Pablo, 2019).

In General Santos City, Philippines, where the research locale is, there is little literature about liner shipping's sustainability efforts because of the port's limited capacity. However, there has been

recent news about the environmental damages caused by the cargo and reefer ships. Aside from the limited capacity of the General Santos City, Philippines port, which affects its flexibility, the incidents have greatly affected the liner shipping's operational performance because of the damage to the environment and its social impact. It has affected the reputation of the refer vessel as well as its crew members. Moreover, it has added penalties and repair costs, affected the quality, and increased the delivery or lead time ("800 sq. m. of Corals Damaged," 2015).

There is only one operating port in General Santos City, Philippines, where the research locale is. There are 12 functional shipping lines as per the Office of the Business Permits and Licenses. Since the shipping lines' total population was low because of their limited capacity, the research respondents were 122 administrative and operative employees of the shipping lines. Shipping lines are considered companies that operate the ships that carry the containers (owned or leased) and cargo from the load port to the discharge port (Manaadiar, 2018). With this scenario, this study explored the relationship between sustainability risk management practices and the operational performance of the shipping line industry in General Santos City, Philippines.

Research Objectives

This study focused on the investigation of the relationship between the sustainability risk management practices and the operational performance of the liner shipping based from the respondents' perception. Specifically, this study had the following objectives:

1. To assess the extent of implementation of sustainability risk management practices in liner shipping in terms of environmental issues, social impacts, and ethical concerns,
2. To identify the degree or extent of the shipping line's operational performance in cost, quality, flexibility, and delivery,
3. To determine if there is the significant relationship between the implementation of the sustainability risk management determinants and the operational performance.

Hypothesis

The study tested the null hypothesis, suggesting no significant relationship between sustainability risk management practices and operational performance.

Review of Related Literature

Geng et al. (2017) have studied the connection between sustainability risk management and operational performance. They emphasized that port managing firms have been forced to shift from profit maximization to include sustainability in their corporate reporting. This was due to the broader media coverage of environmental issues like oil spills and social injustices, such as workers' strikes, which have affected its operations. Eccles et al. (2020) also revealed that highly sustainable firms usually performed better than firms that comply below average with the sustainability disclosure requirements. The results were seen in both the short-term and long-term, which is often reflected in its operational performance.

Several studies supported the claims that implementing environmentally sustainable practices as part of SRM influences operational performance (Lu et al., 2014). According to Geng et al. (2017), Lai and Wong (2012), and Yang et al. (2013), internal environmental management directly influences operational performance as an enhancement of quality and delivery time. Also, green practices within the firm improved the collaboration with supply chain partners, which would help improve the firm's efficiency and flexibility (Vachon & Klassen, 2008).

The human and social capital theory states that employees are essential resources that reflect the extent of social contacts within the organization and contribute to its economic productivity and operational performance (Tan, 2014). Therefore, promoting corporate social responsibility as one component of SRM was vital to those firms who wish to achieve better operational performance (Lau et al., 2018). Wang and Qian (2011) stated that firms that implement corporate social responsibility have a positive effect and significant influence on operational performance despite environmental uncertainties. However, Wan and Liu (2013) contradicted their findings.

Some studies offered evidence of a positive linkage between ethical and good corporate governance as part of SRM and operation performance, including the papers of Tang et al. (2012), Torgusa et al. (2012), and Zaborek (2014). In addition, good corporate governance could build a firm's reputation and protect itself against possible incidents that could harm its reputation, significantly affecting its performance (Minor & Morgan, 2011). However, Matuszczak and Rozanska (2017) and Lu et al. (2014) contradicted these findings, for they found no evidence of significant relationship (either positive or negative) of good corporate governance on a firm's operational performance.

Theoretical Framework

The independent variables were based on Saadchom's Four Risk Categories for ERM Framework under the Sustainability Platform.

Saardchom (2013) iterated that sustainability risks include environmental issues, social impacts, and ethical concerns.

The researcher adopted the three emerging sustainability risk areas for business, environmental, social, and ethical, as the independent variables.

Saardchom's sustainability framework is an addition to the existing Enterprise Risk Management. The Committee of the Sponsoring Organization of the Treadway Commission (2018), the original author of the Enterprise Risk Management, has already incorporated the ERM framework's sustainability platform. The sustainability risks include environmental, social, and governance (ESG), and though not required, several companies have already adopted sustainability risk management and reporting, like Maersk Line. This recent development of the ERM framework supported Saardchom's Journal of Sustainability to the ERM framework. However, one challenge about this topic is its early stage, which has yet to be explored. Few researchers supported Saardchom's claim and examined its variables.

This study's dependent variable was operational performance, measured using the following indicators – cost, quality, time, and flexibility. These indicators were also used in pharmaceutical, banking, and manufacturing firms. The researcher adopted these operational performance indicators because they were the most commonly adopted indicators used in various research of Al-Adaileh et al. (2020), Opoku et al. (2020), Vanichchinchai (2014), and Vaidya and Hudnurkar (2012).

In this research, the following indicators were defined. Cost is the total expenses incurred by completing all or specific activities Al-Tamimi (2015). Quality is the firm's commitment to improving all areas and functions to satisfy the customers (Garvin, 2014). Flexibility is the firm's ability to adapt to supply and demand fluctuations in product or service specification and volume Al-Tamimi (2015). Delivery is the company's time limit to provide the product or services per the agreed timetable (Gimenez et al., 2011)

Conceptual Framework

The study seeks to find out if there was a significant relationship between the sustainability risk management practices and operational performance in General Santos City, Philippines' shipping industry, which result will either support or contradict the claim that the longevity and profitability of liner shipping operators depend on a proactive approach to sustainability (Lai & Wong, 2012).

Materials and Methods

Research Design

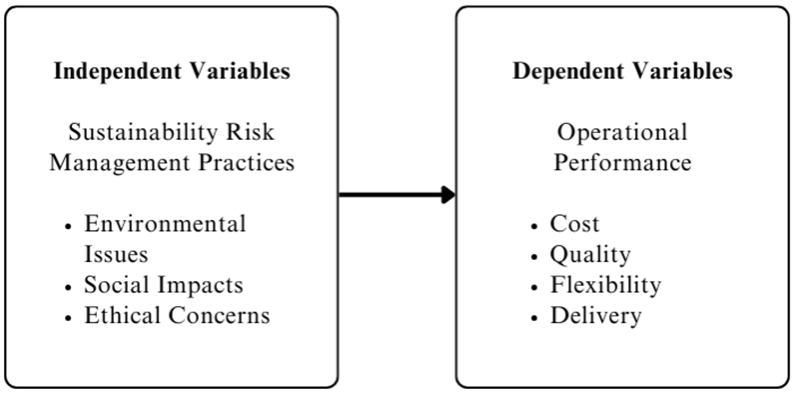
The study used a descriptive-correlational

Figure 1

Four Risk Categories for ERM Framework under Sustainability Platform [28]

Figure 2

Conceptual Framework



research design. According to Creswell (2012), this type of research was a quantitative procedure that measures the extent and degree of relation or association between two or more variables.

Sample

The research participants were the administrative and operative employees of 12 operating shipping lines in General Santos City, Philippines since they performed the operations closely. A complete enumeration involving 122 administrative and operative employees working in the said 12 shipping lines was asked to participate in the survey. However, only 104 employees were qualified since they had access to sustainability reports. The researcher chose the administrative and operative employees as the respondents since they were the key players in operations regarding cost, quality, flexibility, and delivery and could access the internal reports. Three specific questions were included in Part B of the survey questionnaire to gather more reliable results from the employees and to validate their capacity as respondents. Furthermore, to meet the assumptions of the normality of data, only 89 respondents were considered for the analysis.

Instrument

The research instrument for this study was a survey questionnaire. The questionnaire for employees was subdivided into four (4) parts. The first part encompassed the general information about the participant. The second part of the questionnaire contained the shipping lines' demographic profile and three questions about the sustainability report and the employees' access to it to validate their ability to answer the questionnaire. The third part included the shipping lines' sustainability risk management practices, and the fourth part had questions related to operational performance. The researcher adopted and modified the questionnaire from the research entitled The Impact of Supply Chain Integration on Operational Performance at Jordanian Pharmaceutical Manufacturing Organizations authored by Al-Tamimi (2015).

All questions on sustainability risk management and operational performance were measured using a six (6) point Likert type. The respondents were required to give a rating of 6 = to a very large extent, 5 = to a large extent, 4 = to a moderate extent, 3 = to some extent, 2 = to a small extent, and 1 = not at all for each variable included in the questionnaire.

The questionnaire was validated by one expert in port operations, one academician, and an employee with an MBA. After its validation, the researcher conducted a validity and reliability test. Due to the limited number of employees in the liner shipping in General Santos City, Philippines, the researcher employed a reliability test amongst the 30 employees of the liner shipping in Davao City, Philippines. The researcher conducted a reliability test among the 15 Solid Shipping Lines Corporation employees and another 15 employees from Maersk Line. Using SPSS, the result showed that the Cronbach alpha is 0.825. This implied that the questionnaire had an excellent internal consistency to represent a construct (Kaplan & Saccuzzo, 1982).

Data Collection

This study identified the shipping lines' current sustainability risk management practices regarding environmental issues, social impacts, and ethical concerns. The operational performance was also investigated as indicated by the firm's cost, quality, flexibility, and delivery as perceived by the

employees.

This research was conducted based on the primary data collected through the survey using a questionnaire given to the respondents, particularly the shipping lines' employees. The researcher used a paper survey questionnaire since it is more convenient than Google Forms due to the respondents' schedules. Due to the time constraint, availability of the respondents, and the pandemic, the researcher requested the branch manager of each shipping line to distribute the questionnaires to the firm's administrative and operative employees. The researcher was asked to retrieve the questionnaires for three to five working days.

Secondary data were also employed in the study using a review of related literature from several previous studies, published journals and articles, and data on shipping lines in the Business Permits and Licenses Office of General Santos City, Philippines.

Data Analysis

Descriptive statistics such as mean and frequency were used to analyze the degree of sustainability risk management practices and operational performance of the shipping lines. Pearson Product-Moment Correlation was used to analyze the relationship between variables.

The research was conducted with the full consent and permission of the participants. The anonymity of the participating firms and enterprises and the research participants' privacy were highly observed, and the confidentiality of the data obtained shall be ensured.

Results and Discussion

Sustainability Risk Management Practices (SRMP)

Table 1 shows that the SRM practices in terms of social impact and ethical concerns are practiced to a very large extent, followed by environmental issues. This shows that the environmental issues rank last among the three sustainability risk management practices of the 12 shipping line industries in General Santos City, Philippines.

The ethical concerns that pertain to good governance were practiced to a very large extent (Mean=5.37; SD=0.62). This showed that the shipping lines employed strategies to ensure that the firm was not involved in human rights abuses to a large extent. Furthermore, the result showed that the firm eliminated discriminatory pay and promotional practices and worked against all forms of corruption to a very large extent.

Social impact showed that strategies regarding social responsibility were employed to a very large extent (Mean=5.33; SD=0.60). This confirmed that shipping lines greatly prioritized safety in the workplace by providing proper gear and equipment. Moreover, the result showed no sweatshop practices, illegal working conditions, or discrimination concerning employment and occupation in the shipping lines.

The environmental issues ranked last among the three SRM practices, which were to a large extent (Mean=4.81; SD=0.40). This implies that the strategies employed regarding environmental issues include setting up new and efficient technology systems to reduce emissions to a large extent. Moreover, this showed that their strategy to team up with other environmental agencies was also to a large extent.

The sustainability risk management practices in General Santos City, Philippines are, to a very large extent, in terms of social impacts and ethical concerns due to the initiatives of the Philippine Port Authority to fill skill gaps, provide employment, and eradicate graft within the shipping industry (Pablo, 2019). It has been their goal since 2017 under the PPA roadmap project.

Moreover, the practices to mitigate environmental issues are, to a large extent, due to the initiatives of the Philippine Port Authority under the roadmap of the Green Port project to establish sustainable energy resources. The PPA roadmap also includes infrastructure development of the ports and shipping lines, industrial ports, and interconnectivity (Pablo, 2019).

Table 1

Level of Sustainability Risk Management Practices

Variable	*Mean*	*Std. Deviation*	*Interpretation*
Environmental Issue	4.81	0.40	Large extent
Social Impact	5.33	0.60	Very large extent
Ethical Concerns	5.37	0.62	Very large extent

Operational Performance (OP)

Table 2 showed that the perceived cost among all other operational performance indicators was the highest, which was practiced to a large extent (Mean=4.67; SD=0.40555). The result implied that cost has increased to a large extent due to the employment of new energy systems and the improvement of working conditions. On the other hand, costs also decreased to a large extent by using the cheapest transportation and reducing customer complaints.

Perceived quality ranks second to a large extent (Mean=4.56; SD=0.40578). The result indicated that the quality of the shipping lines is at a large extent. The result implies that firms focus on maintaining quality by properly storing goods and providing various services to meet customer demands.

The level of perceived delivery is at a large extent (Mean=4.37; SD=0.78556). This indicated that the shipping lines deliver the goods within the agreed timetable. Moreover, results showed that the firms employed new technology systems for faster transactions and quicker exchange of information with the employees, clients, and other stakeholders.

Lastly, the level of perceived flexibility is moderate (Mean=4.00; SD=0.96109). The results implied that the amendment of services, the firm's response to internal and external changes, and the client's payment options were practiced moderately.

The shipping lines' operational performance level would benefit the firm and customers since the measures primarily focus on achieving competitive advantage, customer loyalty and satisfaction, and maximum profit. The level of operational performance of the shipping lines also shows the firm's ability and capacity to operate efficiently to satisfy customers.

Customers have become the key players who create competition among organizations (Barney, 2012). Therefore, firms should ensure that they can operate efficiently to satisfy the customers (Gimenez, 2011).

Relationship of Sustainability Risk Management Practices (SRMP) and Operational Performance (OP)

Table 3 shows that only the Sustainability of Risk Management Practices regarding environmental issues has a significant value (Sig. = 0.049) of less than 0.05. Also, the Pearson statistic is 0.209. The result implies a very low significant relationship between environmental issues and operational performance.

Furthermore, the table shows insufficient evidence to show a significant relationship between social impact and operational performance and ethical concerns and operational performance because the significant value is greater than 0.05.

The findings of this study expose that only strategies regarding environmental issues, such as employment of clean shore power, building more efficient energy systems, setting up new technology systems to reduce GHG emissions, and teaming up with environmental agencies, have a significant relationship to operational performance. Therefore, regardless of the very low relationship to operational performance, firms may opt to continue their initiatives to mitigate environmental issues since it may still affect their competitive advantage, customer loyalty and satisfaction, and profit maximization.

The findings coincide with the conclusions of Geng et al. (2017), Lai and Wong (2012), and Yang et al. (2013) that building initiatives to mitigate environmental issues may improve the firm's operational performance in terms of quality and delivery time. Also, the results support the statement of Vachon and Klassen (2008) that "green practice" within the firm will also improve collaboration with supply chain partners, which would help improve the firm's efficiency and flexibility.

The result also shows that the initiatives to mitigate social impacts, such as prioritizing safety in the workplace and eliminating discrimination concerning employment and occupation, have no significant relationship to operational performance. Also, the strategies to alleviate ethical concerns,

Table 2

Level of Operational Performance

Variable	*Mean*	*Std. Deviation*	*Interpretation*
Cost	4.67	0.40555	Large Extent
Quality	4.56	0.40578	Large Extent
Flexibility	4.00	0.96109	Moderate Extent
Delivery	4.37	0.78556	Large Extent

Table 3

Relationship of SRMP to OP

Variable	***Operational Performance***
1. Environmental Issues	0.209*
2. Social Impact	-0.029
3. Ethical Concerns	0.071

Note. *p < 0.05

such as providing safe data storage to avoid cybercrime and working against corruption, have no significant relationship to operational performance (Benest et al., 2009).

Hence, the results of this study show contrary to the findings of several pieces of research by Tang et al. (2012), Torgusa et al. (2012), and Zaborek (2011), which claimed that ethical concerns or good corporate governance have an effect and relationship to the operational performances. Moreover, the claims of Tan (2014), Lau et al. (2018), and Wang and Qian (2011), that social impact or corporate social responsibility has a positive association with operational performance opposes the findings of this study.

Conclusion

The study's findings confirmed that the sustainability risk management practices of liner shipping in terms of environmental issues have a low significant relationship to operational performance. On the other hand, there is not enough evidence that social impacts and ethical concerns have a significant relationship to operational performance.

Recommendations

The result shows that SRM practices in terms of social impacts and ethical concerns are practiced to a very large extent. On the other hand, environmental issues ranked last. In previous studies, environmental issues are a prime concern within the shipping and maritime industry. Thus, the industry may consider making more efforts and initiatives to preserve the environment while operating on the seas. The government regulators, especially the DENR, should consider taking initiatives to make the industry's operation sustainable. They may ask for sustainability reports focusing on the environment from the firms to ensure sustainable operations.

Among the components of operational performance, perceived flexibility ranked last. Therefore, firms may focus on flexibility regarding quick amendments of products according to customers' demands, prompt responses to customer needs and queries, and flexible payment arrangements. These initiatives will make employees appreciate their role in the firms and will serve the customers better.

Among the three components of SRM, only environmental issues have a significant relationship with the operational performance of shipping lines. However, the Pearson statistic is only 0.209, which means the relationship is very low. Regardless of the very low relationship to operational performance, firms may opt to pay careful attention to environmental issues, for results showed that among the SRM practices, the environmental initiatives ranked last in the implementation. The firms are encouraged to establish efficient systems to reduce greenhouse gas (GHG) emissions and harmful chemicals such as petrol in the ocean. They may also collaborate with government agencies such as DENR and other environmentalist groups to support them in undertaking initiatives to preserve the environment while operating.

As for the ethical concerns and social impact, though there is no sufficient evidence of their relationship to operational performance, they may continue implementing its practices to a large extent, for this affects the employees, who are the key players in operations. The shipping lines may continue to operate ethically by ensuring that they are not involved in any human rights abuses, which will affect their credibility and integrity to the customers and other stakeholders. They may also opt to continue to employ strategies to eliminate discriminatory pay and promotion practices, provide safe data storage to avoid cybercrime, promote greater accountability for the environment, and work against all forms of corruption, for it affects their reputation as a firm to the maritime industry, government regulators, environmentalist groups, customers, and other stakeholders.

Sustainability Risk Management was a new emerging topic within the industry. There were limited studies on the relationship between SRM and the shipping lines' operational performance in the research locale. Thus, this research might be a springboard for future researchers to explore different variables determining a firm's operational performance. The environmental issue, which is the primary variable of SRM, has been proven to have a very low significant relationship to the operational performance; future researchers may change the respondents to the branch managers of the shipping lines in order to get a more accurate result that could be a good comparison to this research. Moreover, future researchers may include moderating variables to the theoretical framework, such as the shipping lines' age, size, and the number of employees, to determine if these variables influence how SRM practices are implemented among the firms.

Acknowledgments

I would like to extend my sincere appreciation to the School of Business and Governance, with a special acknowledgment to Dr. Margie Clavano, CPA, and Ma'am Jenny Pio, MBA, for their unwavering support from the inception of my academic journey at Ateneo de Davao University and for their invaluable guidance in shaping the foundation of this research. I am deeply grateful to my academic advisor, Dr. Jovelyn A. Castro, LPT, for her remarkable patience, continuous support, and timely feedback, which proved instrumental in the initial presentation of this study. I would also like to express my gratitude to my esteemed panelists, Dr. Leonore Loqueloque, CPA; Dr. Joanne Java, CPA; and Dr. Ronald Mamaril, CPA, for their invaluable insights that significantly enhanced the quality of my research. It has been a privilege to gain knowledge from all of you. And to my spouse, Osmar Jibe Paparon, LCB, whose professional expertise as a customs broker within the shipping industry has greatly contributed to the development of this research, I extend my heartfelt gratitude. Lastly, my heart is full of praises and gratitude to Abba Father for giving me the strength and the countless favors I have enjoyed throughout this journey. Soli Deo Gloria!

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